CLAIMS

What is claimed:

1. An insulation system comprising:

a first honeycomb panel having a honeycomb core encased in an evacuated container of insulating material; and

a second honeycomb panel having a honeycomb core encased in an evacuated container of insulating material, wherein the first and second panel are placed in an offset arrangement.

2. The insulation system of claim 1 further comprising additional honeycomb panels each having a honeycomb core encased in an evacuated container of insulating material, wherein the additional panels are placed in an offset arrangement.

3. The insulation system of claim 1 wherein the cells of honeycomb have a hexagonal shape.

4. A structural member having a combination of substantial stiffness and a high thermal resistance, the structural member comprising:

two or more honeycomb cores adapted for stacking in an offset arrangement and having parameters selected to provide a desired stiffness; and

one or more layers of thermal insulation materials selected to provide a desired thermal resistance, the thermal insulation materials surrounding each of the honeycomb cores forming a sealed container that is evacuated to provide vacuum containment of the honeycomb cores.

5. The structural member of claim 4 wherein the honeycomb core has a hexagonal shape.

6. The structural member of claim 5 wherein the offset arrangement is provided by a horizontal shift.

7. The structural member of claim 5 wherein the offset arrangement is provided by a vertical shift.

8. The structural member of claim 4 wherein the offset is provided by utilizing honeycomb cores of different geometrical shapes.

9. The structural member of claim 4 wherein the honeycomb core material is comprised of a material having low conductivity.

10. The structural member of claim 4 wherein the honeycomb core material is comprised of a material having high conductivity and high strength parameters.

11. The structural member of claim 4 wherein the honeycomb core cell walls are comprised of aluminum.

12. The structural member of claim 11 wherein the thermal insulation material is aluminized mylar.

13. A structural system having a high thermal resistance comprising:

a plurality of honeycomb cores, wherein each of the honeycomb cores has cells with the same geometric shape and further wherein each of the honeycomb cores has the same thickness;

vacuum containers for separately enclosing each of the honeycomb cores, wherein the honeycomb cores are placed in the containers and the containers are evacuated; and

a means for securing an offset stacked arrangement of the vacuum contained honeycomb cores.

14. The structural system of claim 13 wherein each of the cores has the same thickness.

15. The structural system of claim 13 wherein the core material has low conductivity.

16. The structural system of claim 13 wherein the vacuum containers have multiple layers of radiation blocking material.

17. The structural system of claim 13 wherein the cell geometrical shape is selected to minimize the contact area between adjacent cell walls of the stack of enclosed honeycomb cores.

18. The structural system of claim 13 wherein the vacuum containers are comprised of multilayers of thermal material.

19. A method of providing an insulation system comprising:

providing a first and second honeycomb core;

encasing each of the cores in an evacuated container of insulation material thereby providing a first honeycomb panel and a second honeycomb panel; and

placing the panels in an offset arrangement.

20. The method of claim 19 further comprising placing additional honeycomb panels in an offset arrangement with the first and second panels.

21. An insulation system comprising:

a first honeycomb core; and

a second honeycomb core, wherein the first honeycomb core and the second honeycomb core are stacked in an offset arrangement.

22. The insulation system of claim 21 wherein at least one of the honeycomb cores is wrapped with insulation material.

23. The insulation system of claim 21 wherein at least one of the honeycomb cores is enclosed in an evacuated container.